Module 06 – Transshipment Problem

Exploratory Data Analysis

*In this section, you should perform some data analysis on the data provided to you. Please format your findings in a visually pleasing way and please be sure to include these cuts:*

* *Make a visual graph of your data like what we saw for the sample problem*
  + <https://excalidraw.com>
  + <https://mermaid.live>
  + <https://dreampuf.github.io/GraphvizOnline>
  + PowerPoint

A diagram of different types of candy

AI-generated content may be incorrect.

Model Formulation

*Write the formulation of the model into here prior to implementing it in your Excel model. Be explicit with the definition of the decision variables, objective function, and constraints.*

*Hint: This one differs a bit from the sample problem in terms of Balance-of-Flow*

Min = 37X17+33 X24+ 45X37+ 38X45+43X48+43X49+27X54+43X56+32X65+37X75+45X78+46X79+44X84

-X17 ≥ -368

-X24 ≥ -327

-X37 ≥ -203

+X54 +X84 +X24 –X45 –X48 –X49 ≥ 96

+X45 +X65 +X75 –X54 –X56 ≥ 145

+X56 –X65 ≥ 225

+X17 +X37 –X75 –X78 –X79 ≥ 193

+X48 +X78 –X84 ≥ 161

+X49 +X79 ≥ 180

Model Optimized for Minimal Transportation Cost

*Implement your formulation into Excel and be sure to make it neat. This section should include:*

* *A screenshot of your optimized final model (formatted nicely, of course)*
* *A text explanation of what your model is recommending*
* *Update your graph from the EDA section to bold/color the links being used (and show how much is going through that link)*

A screenshot of a chart

AI-generated content may be incorrect.

The model recommends using all links except for 4🡪5, 5🡪4, 6🡪5, 7🡪9, 8🡪4. With this solution not all demand for location 6 is met but cost is kept at a minimum.

A diagram of different types of candy

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Model with Stipulation

*Please copy the tab of your original model before continuing with the next part to avoid messing up your original solution.*

*Follow these steps to complete this section:*

1. *Describe the necessity of the Balance-of-Flow for this problem type*

*Because we need to be aware that demand is greater than supply. This tells us the relationship between NetFlow and Supply/Demand*

1. *What happens when you change your model to make Total Supply > Total Demand (i.e. add 115 units to one of the sources)*
2. *What happens when you rerun your model?*

*The cost rises to about $13000 but all demand is met.*

1. *What do you need to change to make your model work again?*

*It Worked*

1. *Make the changes and report on your findings.*
   1. *PS there is a small chance that the source you added 115 to may make your model infeasible. If so, add the 115 units to a different source.*

*A screenshot of a graph

AI-generated content may be incorrect.*